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**Maricopa County Environmental Services Department  
Air Quality Division  
Operation and Maintenance (O&M) Plan Guidelines**

**Revised April 15, 2002**

This document provides guidance in the preparation of O&M Plans required as part of an Air Quality Permit and/or Maricopa County Air Pollution Control Regulations. The goal is to establish acceptable operating parameters and limits, maintenance procedures and schedules, and documentation methods that will demonstrate the control device is being properly operated and maintained. Each device that is unique in type, capacity, or use must be contained in a separate plan. Multiple control devices can be combined in a single O&M Plan providing they are identical in type, capacity, and use.

**I) GENERAL INFORMATION**

This information provides identification and a quick understanding of the facility and equipment and the basis for the O&M Plan.

**II) OPERATION PLAN**

Key operating parameters are quantifiable parameters (pressure drops, temperatures, flow rates, etc.) that, once properly defined, are considered indicators that a control device is functioning as designed. Operations log sheets should, at a minimum, contain the following information: date and time of readings; identification of the individual recording the data; operating parameters to be monitored including units of measure, operating limits (upper and/or lower limits), and space for recording measurements; measurement frequency; and space for additional information such as corrective action taken or general comments. A log sheet must be completed for every day the process and control device are in operation. All values are to be recorded including those outside the operating limits at the time readings are taken. Sample operations log sheets are available from the Division for common types of control devices. A copy of the actual log sheet(s) to be used at the facility are to be included in the O&M Plan.

If an automatic data recording system will be used, provide information on its measurement frequency and how the information will be recorded in addition to the above requirements. If recording charts are used, provide space on the charts

to document the date, time, and initials of the individual checking system performance.

If changing the location of the measurement device would affect its reading (for example, the location of the thermocouple on an afterburner), then the location of the device must be documented either in the text of the O&M plan or through a scaled drawing.

### **III) MAINTENANCE PLAN**

Maintenance procedures (inspections, cleanings, lubrications, adjustments, replacements, instrumentation calibrations, etc.) are performed on a routine basis to ensure the equipment remains in peak operating condition. Maintenance checklists should, at a minimum, contain the following information: date; identification of the individual performing the maintenance check; procedures to be performed including frequency of occurrence; results of inspection (acceptable, nozzle plugged, belt cracked, etc.); corrective action taken (none, cleaned nozzle, replaced belt, etc.); and space for additional information such as observations or general comments. Sample maintenance checklists, containing general preventative maintenance that should be considered, are available from the Division for common types of control devices. A copy of the actual checklist(s) to be used at the facility are to be included in the O&M Plan.

### **IV) ADDITIONAL INFORMATION**

Permit conditions may contain additional O&M Plan requirements such as training provisions. Supplemental information, such as process diagrams, control device schematics, etc. may be included only if it would be helpful in understanding the O&M Plan. Please do not provide a copy of the O&M Plan supplied by the equipment manufacturer.

All O&M Plan forms are available electronically on the County website.

For Adobe Acrobat format (.pdf), enter  
[www.maricopa.gov/envsvc/AIR/permits/O%26M.PDF](http://www.maricopa.gov/envsvc/AIR/permits/O%26M.PDF)

For Microsoft Word format (.doc), enter  
[www.maricopa.gov/sbeap/O\\_MGUIDE.DOC](http://www.maricopa.gov/sbeap/O_MGUIDE.DOC)

Changes to an existing O&M Plan should be made by submitting a complete, revised O&M Plan with a cover letter identifying all changes and the reason for such changes.

This document is meant to serve as a general guideline in the preparation of O&M Plans. Since unique circumstances may exist, the Division reserves the right to request additional information to ensure compliance with air quality regulations.

**MARICOPA COUNTY ENVIRONMENTAL SERVICES DEPARTMENT  
AIR QUALITY DIVISION  
OPERATION AND MAINTENANCE (O&M) PLAN**

**I) GENERAL INFORMATION**

Business Name: \_\_\_\_\_

Business Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Permit Number: \_\_\_\_\_

Date Of Preparation/Revision: \_\_\_\_\_

General description of overall facility operations: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Description of process(es) ducted to control device(s) including pollutants controlled:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Complete description of control device(s) covered by the plan including manufacturer, model, rated capacity, total number of identical units, equipment identification number, etc.: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Business Name: \_\_\_\_\_

Equipment Identification: \_\_\_\_\_

O&amp;M Plan Revision Date: \_\_\_\_\_

## II) OPERATION PLAN

List the operating parameters to be monitored including the units of measure (inches H<sub>2</sub>O, deg F, gpm, etc.), operating limits (upper and/or lower limits), and frequency of recording measurements (daily, continuous, etc.). List the method of recording measurements (manual, stripchart recorder, data acquisition system, etc.) and type of instrumentation (magnehelic, temperature sensor, flowmeter, etc.) with instrument display range for each operating parameter:

[illegible]

Attach a copy of all operations log sheets, stripcharts, computer printouts, etc. utilized to document operating parameters of the control device.

Notes: Instrumentation accuracy is expected to be comparable to industry standard for the specific type of instrumentation.

Operating limits may require modifications to reflect actual conditions during compliance testing.

A log sheet must be completed for every day the process and control device are in operation.

Records are required to be maintained for a minimum of five years.

O&amp;M Plan Revision Date: \_\_\_\_\_

O&amp;M Plan Revision Date: \_\_\_\_\_

## **Sample Operations Log Sheets & Preventative Maintenance Checklists**

**Revised April 15, 2002**

Attached are sample operations log sheets and preventative maintenance checklists for a variety of control devices. Depending on the particular equipment and its application at your facility, some operating parameters and maintenance procedures may not be applicable or additional items may be necessary. If your specific control device is not one of the those addressed in the attached forms, follow the O&M Plan Guidelines or contact the Division for assistance.

### **OPERATIONS LOG INSTRUCTIONS**

The operating parameters contained in the attached operations log sheets are representative of desirable operating parameters available for that equipment. Although it is highly recommended that as many of these parameters as possible be monitored and recorded, the minimum acceptable operating parameters for each control device are shown below:

Wet Scrubber: Scrubber system pressure drop and water recirculation rate (possibly pH level and conductivity, depending on application).

Thermal Oxidizer: Combustion temperature.

Catalytic Oxidizer: Pre-catalyst temperature, post-catalyst temperature and catalyst pressure drop.

Carbon Adsorption System: Adsorption temperature, desorption temperature, and effluent concentration.

Baghouse: Baghouse pressure drop and visible emissions (possibly inlet temperature, depending on application).

Cyclone: Visible emissions.

It may be useful for facilities with multiple control devices to record data on a single log sheet.

### **MAINTENANCE CHECKLIST INSTRUCTIONS**

The maintenance procedures and performance frequencies contained in the attached checklists are general procedures that should be considered for your equipment. Consult the equipment manufacturer for specific procedures and performance frequencies appropriate for your equipment.



Name: \_\_\_\_\_

Business

Identification: \_\_\_\_\_

Equipment

Date: \_\_\_\_\_

O&M Plan Revision

It may be useful to create separate forms for each maintenance period (i.e. weekly, quarterly, etc.) or record multiple sets of procedures on one checklist (i.e. one month's worth of weekly and monthly procedures on one form).

O&amp;M Plan Revision Date: \_\_\_\_\_

**COMMENTS (INCLUDING CORRECTIVE ACTION TAKEN):**

Business Name: \_\_\_\_\_

Equipment Identification: \_\_\_\_\_

O&M Plan Revision Date: \_\_\_\_\_

**WET SCRUBBER SYSTEM  
PREVENTATIVE MAINTENANCE CHECKLIST**

**DATE:** \_\_\_\_\_

**TECHNICIAN:** \_\_\_\_\_

**WEEKLY PROCEDURES:**

**RESULTS**

**ACTION TAKEN**

Check pump & fan motor for unusual  
vibration, noise, or heat

Inspect system for leaks

Check system dampers for proper operation

Check chemical metering pumps & probes for  
proper operation

**MONTHLY PROCEDURES:**

**RESULTS**

**ACTION TAKEN**

Inspect spray nozzle distribution pattern

Inspect/clean flow strainer

Check fan housing drain

Check condition of fan bearings, belts, &  
seals

Inspect fan impeller & blades for solids  
buildup or erosion

**QUARTERLY PROCEDURES:**

**RESULTS**

**ACTION TAKEN**

Inspect packing for breakage & settling

Check piping for erosion or plugging

**SEMI-ANNUAL PROCEDURES:**

**RESULTS**

**ACTION TAKEN**

Calibrate instrumentation

Inspect sump, packing, & ductwork for solids  
buildup

Inspect tower internals for corrosion or  
breakage

Inspect ductwork, fan, & structural supports  
for deterioration/damage

**COMMENTS:**

Business Name: \_\_\_\_\_  
Equipment Identification: \_\_\_\_\_  
O&M Plan Revision Date: \_\_\_\_\_

**THERMAL OXIDIZER  
DAILY OPERATIONS LOG SHEET**

**PARAMETER**

**LIMITS**

**READINGS**

Inlet gas flow rate (cfm)

Inlet temperature (°F)

Combustion gas temperature (°F)

Stack temperature (°F)

Fuel flow rate (cfm)

Visible emissions present at outlet

Date

Time

Technician

**COMMENTS (INCLUDING CORRECTIVE ACTION TAKEN):** \_\_\_\_\_

Business Name: \_\_\_\_\_

Equipment Identification: \_\_\_\_\_

O&M Plan Revision Date: \_\_\_\_\_

**THERMAL OXIDIZER  
PREVENTATIVE MAINTENANCE CHECKLIST**

**DATE:** \_\_\_\_\_

**TECHNICIAN:** \_\_\_\_\_

**WEEKLY PROCEDURES:**

**RESULTS**

**ACTION TAKEN**

Inspect fuel piping train for leaks

\_\_\_\_\_

\_\_\_\_\_

**MONTHLY PROCEDURES:**

**RESULTS**

**ACTION TAKEN**

Check condition of fan bearings & belts

\_\_\_\_\_

\_\_\_\_\_

Inspect refractory for cracks

\_\_\_\_\_

\_\_\_\_\_

Inspect/clean burner area

\_\_\_\_\_

\_\_\_\_\_

**QUARTERLY PROCEDURES:**

**RESULTS**

**ACTION TAKEN**

Inspect system/ductwork for leaks

\_\_\_\_\_

\_\_\_\_\_

Lubricate fan motor bearings

\_\_\_\_\_

\_\_\_\_\_

Inspect burner for warpage & corrosion

\_\_\_\_\_

\_\_\_\_\_

Inspect burner gas jets for corrosion &  
deposits

\_\_\_\_\_

\_\_\_\_\_

Inspect electrical valves & interlock switches  
for dirty contacts, moisture leaks, &  
deteriorating insulation

\_\_\_\_\_

\_\_\_\_\_

Verify interlocks are working

\_\_\_\_\_

\_\_\_\_\_

**SEMI-ANNUAL PROCEDURES:**

**RESULTS**

**ACTION TAKEN**

Inspect outer shell for weld cracks & hot  
spots

\_\_\_\_\_

\_\_\_\_\_

Calibrate instrumentation

\_\_\_\_\_

\_\_\_\_\_

Inspect ductwork for dirt & blockages

\_\_\_\_\_

\_\_\_\_\_

**COMMENTS:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

O&amp;M Plan Revision Date: \_\_\_\_\_

**COMMENTS (INCLUDING CORRECTIVE ACTION TAKEN):**

Business Name: \_\_\_\_\_

Equipment Identification: \_\_\_\_\_

O&M Plan Revision Date: \_\_\_\_\_

**CATALYTIC OXIDIZER  
PREVENTATIVE MAINTENANCE CHECKLIST**

**DATE:** \_\_\_\_\_

**TECHNICIAN:** \_\_\_\_\_

**WEEKLY PROCEDURES:**

**RESULTS**

**ACTION TAKEN**

Inspect auxiliary fuel piping train for leaks

\_\_\_\_\_

\_\_\_\_\_

**MONTHLY PROCEDURES:**

**RESULTS**

**ACTION TAKEN**

Check condition of fan bearings & belts

\_\_\_\_\_

\_\_\_\_\_

Inspect refractory for cracks

\_\_\_\_\_

\_\_\_\_\_

Inspect/clean burner area

\_\_\_\_\_

\_\_\_\_\_

**QUARTERLY PROCEDURES:**

**RESULTS**

**ACTION TAKEN**

Inspect system/ductwork for leaks

\_\_\_\_\_

\_\_\_\_\_

Lubricate fan motor bearings

\_\_\_\_\_

\_\_\_\_\_

Inspect burner for warpage & corrosion

\_\_\_\_\_

\_\_\_\_\_

Inspect burner gas jets for corrosion &  
deposits

\_\_\_\_\_

\_\_\_\_\_

Inspect electrical valves & interlock switches  
for dirty contacts, moisture leaks, &  
deteriorating insulation

\_\_\_\_\_

\_\_\_\_\_

Verify interlocks are working

\_\_\_\_\_

\_\_\_\_\_

**SEMI-ANNUAL PROCEDURES:**

**RESULTS**

**ACTION TAKEN**

Inspect outer shell for weld cracks & hot  
spots

\_\_\_\_\_

\_\_\_\_\_

Calibrate instrumentation

\_\_\_\_\_

\_\_\_\_\_

Test catalyst for activity

\_\_\_\_\_

\_\_\_\_\_

Inspect ductwork for dirt & blockages

\_\_\_\_\_

\_\_\_\_\_

**COMMENTS:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Business Name: \_\_\_\_\_  
Equipment Identification: \_\_\_\_\_  
O&M Plan Revision Date: \_\_\_\_\_

**CARBON ADSORPTION SYSTEM  
DAILY OPERATIONS LOG SHEET**

**PARAMETER**

**LIMITS**

**READINGS**

Adsorption temperature (°F)

Desorption temperature (°F)

Influent concentration (ppm)

Effluent concentration (ppm)

Air filter pressure drop (in H<sub>2</sub>O)

Steam pressure (psi)

Date

Time

Technician

**COMMENTS (INCLUDING CORRECTIVE ACTION TAKEN):** \_\_\_\_\_



Business Name: \_\_\_\_\_

Equipment Identification: \_\_\_\_\_

O&M Plan Revision Date: \_\_\_\_\_

**CARBON ADSORPTION SYSTEM  
PREVENTATIVE MAINTENANCE CHECKLIST**

**DATE:** \_\_\_\_\_

**TECHNICIAN:** \_\_\_\_\_

**WEEKLY PROCEDURES:**

**RESULTS**

**ACTION TAKEN**

Inspect physical condition of solvent meters

Inspect/replace prefilter

**MONTHLY PROCEDURES:**

**RESULTS**

**ACTION TAKEN**

Check for unobstructed airflow in ductwork

Check gaskets, dampers, & seals for leaks

Check system for signs of corrosion

Check vent & drain lines for plugging

Check for leaks in air ducts, connections, fan  
& filter housings, & around dampers

**SEMI-ANNUAL PROCEDURES:**

**RESULTS**

**ACTION TAKEN**

Check for unobstructed airflow in ductwork

Lubricate bearings, compressed air  
components, & air cylinder shafts

Check system balance

Check condenser for solids buildup

Calibrate instrumentation

Inspect carbon bed depth

Sample carbon for adsorbability & retentivity

Sample wastewater discharge & recovered  
solvent

**COMMENTS:** \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Business Name: \_\_\_\_\_  
Equipment Identification: \_\_\_\_\_  
O&M Plan Revision Date: \_\_\_\_\_

**BAGHOUSE  
DAILY OPERATIONS LOG SHEET**

**PARAMETER**

**LIMITS**

**READINGS**

Inlet temperature (°F)

Outlet temperature (°F)

Baghouse pressure drop (in H<sub>2</sub>O)

Compressed air pressure (psi)

Visible emissions present at outlet

Date

Time

Technician

**COMMENTS (INCLUDING CORRECTIVE ACTION TAKEN):** \_\_\_\_\_

Business Name: \_\_\_\_\_

Equipment Identification: \_\_\_\_\_

O&M Plan Revision Date: \_\_\_\_\_

**BAGHOUSE  
PREVENTATIVE MAINTENANCE CHECKLIST**

**DATE:** \_\_\_\_\_

**TECHNICIAN:** \_\_\_\_\_

**DAILY PROCEDURES:**

**RESULTS**

**ACTION TAKEN**

Monitor cleaning system cycle

**WEEKLY PROCEDURES:**

**RESULTS**

**ACTION TAKEN**

Check for proper system damper operation

Check bag tension

Check compressed air system

Activate key shutdown or bypass controls

**MONTHLY PROCEDURES:**

**RESULTS**

**ACTION TAKEN**

Spot-check bag condition & seating

Inspect system for corrosion & material  
buildup

Check all moving parts for vibration, wear, &  
alignment

**QUARTERLY PROCEDURES:**

**RESULTS**

**ACTION TAKEN**

Thoroughly inspect bags

Inspect door gaskets

Check for dust buildup in ducts

Check proper damper valve seating

**SEMI-ANNUAL PROCEDURES:**

**RESULTS**

**ACTION TAKEN**

Calibrate instrumentation

Check cleaning system for rebalance  
requirement

Inspect baffles, hopper duct, etc. for wear

Inspect general structural integrity of system

**COMMENTS:** \_\_\_\_\_

Business Name: \_\_\_\_\_  
Equipment Identification: \_\_\_\_\_  
O&M Plan Revision Date: \_\_\_\_\_

**CYCLONE  
DAILY OPERATIONS LOG SHEET**

**PARAMETER**

**LIMITS**

**READINGS**

Inlet temperature (°F)

Cyclone pressure drop (in H<sub>2</sub>O)

Gas velocity (ft/sec)

Visible emissions present at outlet

Date

Time

Technician

**COMMENTS (INCLUDING CORRECTIVE ACTION TAKEN):** \_\_\_\_\_

O&amp;M Plan Revision Date: \_\_\_\_\_

**COMMENTS:** \_\_\_\_\_